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ABSTRACT

The State University of New York and Instructional Systems, Inc., (ISI) developed a project to combine computer assisted instruction (CAI) and live, interactive videoconferencing with a television teacher, conducted via cable. The project is being pursued by the Syracuse (New York) City School District in conjunction with the State University of New York, Onondaga County Community College (New York), ISI, and Aldelphia Cable. A teacher from the Syracuse district has been aired once a week for one hour to focus on mathematics content areas in which high school students are having difficulties. The television teacher works in a team with the classroom teachers using the system in school settings and secures their input about the content of the live shows. The model of extended learning is one that can be applied to a number of other areas in elementary and secondary school education, higher education, the workplace, community organizations, and correctional settings. A scenario of CAI use in the future presents the promise of the integration of real-time interactive video, voice, and data to enhance learning and improve learning environments. Two figures illustrate mean gains in achievement in two CAI distance learning classes. (SLD)

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COMBINING COMPUTER ASSISTED INSTRUCTION (CAI) AND A LIVE TV TEACHER TO EXTEND LEARNING OPPORTUNITIES INTO THE HOME

A Learning Productivity Research and Developmental Project of the Research Foundation of the State University of New York and Instructional Systems Inc.

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School is where the learner is . . .

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The Context

Documents issued at state and local levels frequently include reference to the role that technology can play in efforts to reform the public schools. The specific applications of the technology to address that role run a full range of programs that may impact a select few or as many as hundreds of teachers and students. It is encouraging that technology is being recognized as key to change in education because innovative applications of technology have been central to needed reform and restructuring efforts in many other critical fields such as medicine and finance. Unfortunately, efforts to integrate technology into the mainstream of public education have met with significant resistance and had little, if any, effect on the instructional model prevalent across the U.S. Though much of this resistance grows out of personal anxiety of the unknown or fear of job displacement (not uncommon in other fields), there are some very persuasive arguments for resisting the educational technology programs that have developed in the last several years. Common to these persuasive arguments is the fact that a large share of the major, public investments in educational technology applications have been in programs, products, and services that do not directly address student needs, have little or no basis in what we know about effective learning practices and hold no implications for improving the instructional paradigm that has remained unchanged for over 200 years.

To recite the detail related to the needs of the public education system would be redundant. The media has embraced education as a "hot item" and we are informed daily of failings, faults and fraud within our system. Rather, what is needed are creative applications of the technology to help us address these persistent problems and improve upon learning productivity and access.

THE SYRACUSE, NEW YORK IDEA

The State University of New York (SUNY) Central acquired satellite uplink capacity in 1990 and in that year created a downlink network at all of its 64 campus sites. In 1991, in cooperation with key organizations in the K-12 sector, SUNY began to experiment with the offering of live New York State Mathematics Regents Exam review courses for students statewide in collaboration with the cable operators across New York. The format was a traditional presentation with live, call-in capacity. Concurrent with those SUNY efforts, Instructional Systems Inc., the northeastern distributor for Computer Curriculum Corporation products (and a developer of several products unique to New York curriculum), was developing a computer-based product for the same Mathematics curriculum being addressed by the SUNY live, satellite programs. Therein lie the basic elements of an idea whose implications extend well beyond the mediums from which they spring.

In late 1991, representatives of SUNY and ISI met to discuss undertaking a cooperative R&D project to refine the integration of their respective efforts. Some key assumptions that provided the foundation for such a project were:

Assumptions

- The installation of fiber optics and the further development of digital compression technology will soon provide the capacity to fully integrate live, sophisticated, multimedia CAI programming with live, interactive video conferencing. This new learning medium could potentially revolutionize how and where learning opportunities are available on an international scale.

- As an interested and key player in CAI in New York, ISI desires to remain a leader in this arena and be in the forefront as alternate technological options for delivery and integration of learning services evolve.

- As the primary provider of post-secondary opportunities in New York state (40% of SUNY's entering freshman are from New York high schools) and a major provider of teacher training, SUNY has a keen interest in the K-12 sector and an overriding interest in exploring the effective use of learning technologies for a variety of instructional purposes including teacher training.

- It is apparent that the interests and strengths of SUNY and ISI are complementary and attuned to the emerging technological and programmatic capacities that will soon be available to address persistent learning problems in a variety of settings.

From these assumptions, a project to combine CAI and a live, TV teacher delivered via cable was spawned and undertaken in Syracuse, New York.

The Syracuse Model

In Syracuse, the concept of combining the computer assisted instruction (CAI) capacity of Instructional Systems, Inc.(ISI) with a live TV teacher is being pursued by the Syracuse City School District in conjunction with SUNY Central, Onondaga County Community College, ISI and Aldephia Cable.

The TV teacher has been selected by the Syracuse City School District and will be trained by SUNY (via a "TV Teacher Training Institute" being developed with Federal Star Schools funding support). Programming focuses on Math Sequence I and selected students at Nottingham High School have been provided with laptop computers so they can work at home (thereby extending the school day).

Since December 2, Gloria Kilpatrick (the live TV teacher) has been aired once a week for one hour and, using the power of the CAI student management system, has focused on content areas where students are having difficulties. This weekly program proceeds for at least 15 weeks and is now being enhanced significantly with the infusion of Federal funding.

SUNY Central has gained the cooperation of Aldephia Cable to create a "headend" capacity at Nottingham High School which allows the TV teacher to originate her programs from the studio at the school. Onondaga County Community College has agreed to provide student interns to "crew" the productions that originate at Nottingham. Aldephia carries the programs live in Syracuse and NewChannels is considering carrying future programs live to communities surrounding the city. This extensive coverage will extend the benefit of the TV teacher beyond just those students who have laptops, thus providing a supplemental resource for all students taking Math I in the Syracuse area.

Since many students use the ISI CAI system in school, the TV teacher works in a team with the teachers using the system in the school settings and secures their input regarding the content of the live shows. Indeed, some teachers may be asked to participate on the live programs with the TV teacher so as to extend motivation beyond just the students with laptops and create a broader sense of faculty ownership.

Expanding the Model

This program is built upon a model that SUNY-Central developed with Instructional Systems, Inc. and for which SUNY has successfully secured Federal Star Schools funding support through the Great Lakes St. Lawrence Seaway Telecommunications Collaborative. Funds from the Federal Star Schools Program are available to support the costs of the Syracuse project and to expand the project to inner-city schools in New York City (Districts #5 and #12). SUNY will also conduct a "teacher training institute" to prepare the TV teachers in all participating communities and administer a grant program in New York State to assist LEAs in taking full advantage of this and other learning technology applications, particularly national networking via Internet.

Beyond the funding of the Federal Star Schools Project, SUNY has worked with other school districts in New York (and in other States) to apply this model for inhome remediation, adult learning

and programs for incarcerated youth. New York schools seeking alternate avenues of funding for this model include South Colonie, Utica, Gloversville, Lockport, and South Huntington.

Implications for Other Learning Programs

This model of extending learning into the home, workplace or community center using laptop computers and cable television is one that can be applied to a number of other areas where increased access to learning is the central objective. Learning programs for public assistance recipients in the home, for incarcerated youth or for adults with daytime jobs but seeking additional job training are but just a few. New telecommunications capacities such as compressed digital video and fiber optics will soon make live, interactive video and computer capabilities available in most community institutions, workplaces and homes. That capacity will be of direct support to programs such as this and revolutionize access to learning opportunities of all kinds. However, the fact remains that today, using current phone lines and cable TV, we can offer new learning opportunities to business, industry and citizens in their homes and workplaces. This cooperative R&D project of SUNY and ISI, administered through the Research Foundation of SUNY, is a focal point for the development of such learning programs which can be of benefit as follows:

For Whom	Where
- K-12 Students at Risk of Failure in Traditional Educational Settings	- Home
- Postsecondary Students in Need of Remediation	- Workplace
- Workers Seeking New Job Opportunities	- Colleges and Universities
- Public Assistance Recipients and Members of Families Seeking Employability Skills	- Public and Nonpublic Schools
	- Libraries
- Disabled Persons	- Community-based Organizations
- Marginally Employed Workers	- Correctional Institutions
- Non-English Speaking Workers	- Human Service Providers
- Incarcerated Youth Re-entering the Job Market	- Skills Center
- Probationers and Parolees	

The Vision

The cable industry reports that they are installing fiber optics at the rate of 85 miles per hour, every hour of every day. Surely phone companies have a similar rate of fiber installation and, hopefully, the Clinton administration's emphasis on building a telecommunications infrastructure to support education, research and training will accelerate the expansion of broadband access in communities across the U.S. Assuming the development of broadband capacity for education and in-home services does progress at a rapid pace, the following scenario may not be uncommon in thousands of communities across America.

Karen Johnson is a fourth grade teacher in Buffalo, New York. She has been trained on a sophisticated integrated learning system that includes a high level of student motivational, interactive video, graphics and audio reinforcement. Karen's students use the system at school and in their homes. The home access has been provided by the cable company that serves Buffalo through the magic of fiber optics and digital compression techniques. Since inhome systems are not inexpensive, they have been provided to students deemed to be at risk of failing and funded by Chapter I. Karen is able to easily monitor the progress of her 125 students by virtue of the student management data that is collected and reported to her at regular intervals she has determined. In this case, the "electronic report cards" go to her, not 2 or 4 times a year, but weekly. These reports indicate precisely where each student is having difficulty and Karen can ask that students having similar difficulties be listed for her so she can target some special attention to those specific students. In order to provide congruence for the students with the computer curriculum and their classroom curriculum, Karen is able to use the students' CAI reports to create an Individual Education Plan for each student. She simply scans the barcodes of the correlated objectives from the CAI curriculum and IEP program through her computer to the central server and tomorrow she will have an Individual Education Plan for all 125 students. When one or several students have been identified as having difficulty, Karen, through her system interface, asks that the next time that student "signs on", that she be alerted through an audible "urgent message" indicating that the student in need is on the system. When so notified, Karen enters the student's ID number and requests access to the student's active screen. In seconds, Karen appears in a video window on the student's work screen and.... "Hi Sally, I see you are having some difficulty with multiplying fractions. Let's see if I can give you some help and maybe show you a brief video that will help you understand the rules we need to keep in mind".

Sound interesting? Sound like the learning environment can be far more productive and flexible, attuned to known principles of learning theory and able to increase the number of "teachable moments" seized upon by talented teachers? Exactly! It is that kind of improved learning productivity that marks the application of appropriate technologies in nearly every other public and private enterprise in this country. With proper access to bandwidth and compression techniques, Karen might be a teacher in Germany, teaching U.S. students the German language and culture with the most motivational techniques ever known to education. But before we move this capacity to another country, let's start at the community level and build from there. Telecommunications

providers are vying for the right to provide services to the home. Let's encourage them to look at education applications as a first priority, perhaps provide them with tax incentives to do so. The components of the above scenario exist right now (ILS and video conferencing). With a little help from our hometown phone and cable companies, that scenario could be reality in 2-3 years in many cities in the U.S. and revolutionize learning productivity and access.

The SUNY project described here is an attempt, using the telecommunications capacities now available (phone lines and cable TV), to illustrate what can be done if the infrastructure builders turn to educators to define the system requirements and government provides educators the support for pursuing the educational applications. The SUNY participation in the Star Schools project awarded to the Great Lakes St. Lawrence Seaway Telecommunications Collaborative is a significant step in this important direction for K-12 education.

Conclusion

The integration of real-time, interactive video, voice and data delivered through new telecommunications mediums holds more potential for enhancing learning productivity and improving and extending the learning environments than any previous technological developments in our history. The responsibility for creating the effective applications of these new capacities rests with the leadership of public education. Leadership willing to question and modify the assumptions of the traditional learning institutions to match the demands of global competitiveness and the challenge of addressing the individual learning styles of every learner. As we embark on new investments in education and training, let's at the same time define the educational returns we expect to achieve for those investments...returns that reflect far greater learning productivity than we have been able to demonstrate to date.

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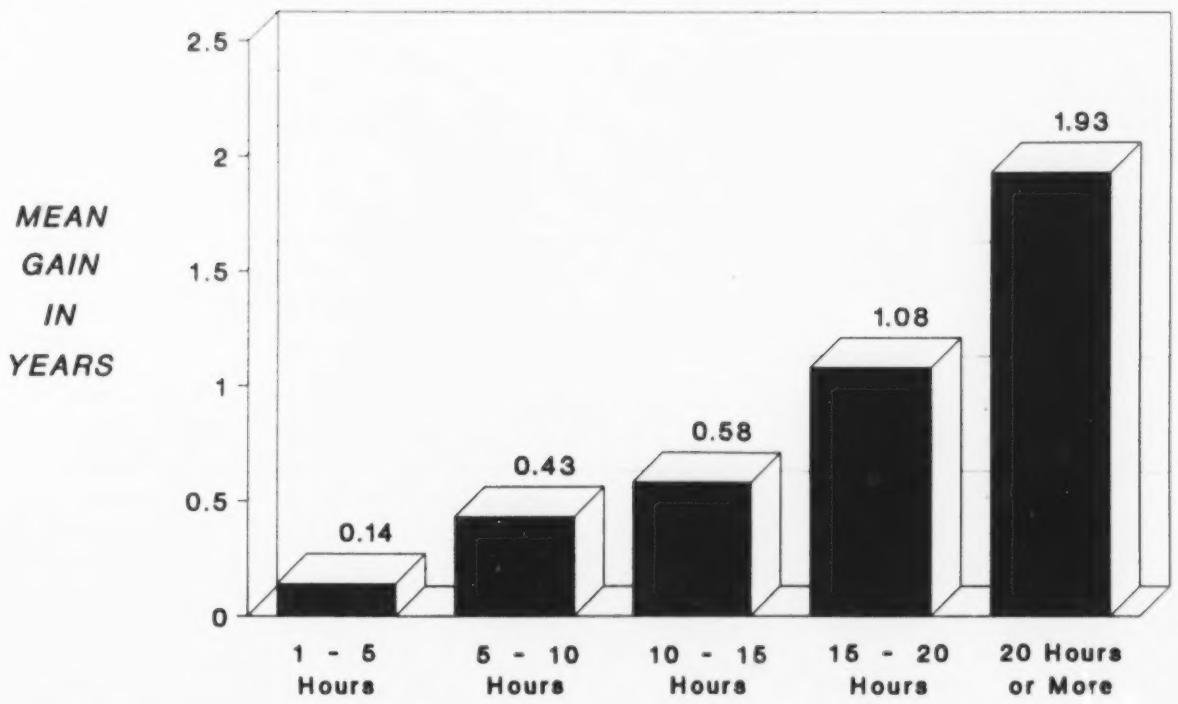
DISTANCE LEARNING
CHAPTER I COMPUTER TAKE HOME PROGRAM

Mean Gain by Students in the CCC Course
READING COMPREHENSION
During the 1992 School Year



DISTANCE LEARNING
CHAPTER I COMPUTER TAKE HOME PROGRAM

Mean Gain by Students in the CCC Course
MATH SKILLS
During the 1992 School Year